CLAIMS

WHAT IS CLAIMED IS:

1. A chelated complex comprised of (a) an antibiotic selected from the group consisting of glycopeptide antibiotics, ribonucleoside antibiotics, quinolone antibiotics, and combinations thereof, and (b) a detectable label comprising a transition or lanthanide metal.
2. The complex of claim 1, wherein the label is a transition metal selected from the group consisting of Zn, Cu, Ni, Co, Fe, Mn, Cr, Tc, and their isotopes.
3. The complex of claim 2, wherein the transition metal is Co or Cr.
4. The complex of claim 1, wherein the label is a lanthanide metal selected from the group consisting of Eu, Gd, Tb, Dy, Er, Lu, and their isotopes.
5. The complex of claim 1, wherein the glycopeptide antibiotic is selected from the group consisting of actinoidin, avoparcin, balhimycins, chloroorienticins, daptomycin, ereomycin, galacardin, helevecardin, orienticins, ristocetins, ristomycin A, teicoplanin, vancomycin, and derivatives thereof.
6. The complex of claim 5, wherein the glycopeptide antibiotic is vancomycin.
7. The complex of claim 1, wherein the ribonucleoside antibiotic is a lincosamides, or a derivative thereof.
8. The complex of claim 1, wherein the quinolone antibiotic is selected from the group consisting of cinoxacin, ciprofloxacin, fleroxacin, gatifloxacin, levofloxacin, lomefloxacin, moxifloxacin, nalidixic acid, norfloxacin, ofloxacin, perfloxacin, sparfloxacin, trovafloxacin, and derivatives thereof.
9. The complex of claim 8, wherein the quinolone antibiotic is nalidixic acid.
10. The complex of claim 1, wherein the complex binds to microorganisms.
11. The complex of claim 10, wherein the microorganisms are microorganisms are selected from the group consisting of gram-positive bacteria, Mycobacteria, permeabilized gram-negative bacteria cells and protozoans.
12. A method for synthesizing a chelated antibiotic-metal complex, comprising: admixing (i) a water soluble salt of a metal selected from the group consisting of transition metals and lanthanides with (ii) an antibiotic selected from the group consisting of glycopeptide antibiotics, ribonucleoside antibiotics, and quinolone antibiotics, in (iii) a solvent for the

metal salt and the antibiotic; wherein the admixing is conducted under conditions effective to promote chelation of the metal by the antibiotic, thereby forming a solution of the chelated antibiotic-metal complex.

13. The method of claim 12, wherein the glycopeptide antibiotic is selected from the group consisting of actinoidin, avoparcin, balhimycins, chloroorienticins, daptomycin, ereomycin, galacardin, helevecardin, orienticins, ristocetins, ristomycin A, teicoplanin, vancomycin, and derivatives thereof.

14. The method of claim 12, wherein the ribonucleoside antibiotic is a lincosamides, or a derivative thereof.

15. The method of claim 12, wherein the quinolone antibiotic is selected from the group consisting of cinoxacin, ciprofloxacin, fleroxacin, gatifloxacin, levofloxacin, lomefloxacin, moxifloxacin, nalidixic acid, norfloxacin, ofloxacin, perfloxacin, sparfloxacin, trovafloxacin, and derivatives thereof.

16. The method of claim 12, wherein metal is a transition metal selected from the group consisting of Zn, Cu, Ni, Co, Fe, Mn, Cr, Tc, and their isotopes.

17. The method of claim 12, wherein the metal is a lanthanide metal selected from the group consisting of Eu, Gd, Tb, Dy, Er, Lu and their isotopes.

18. The method of claim 12, wherein the solvent comprises aqueous buffer.

19. The method of claim 12, further comprising desalting the complex.

20. The method of claim 19, wherein the desalting step comprises dialysis or gel filtration.

21. The method of claim 19, further comprising isolating and drying the complex.

22. The method of claim 21, wherein the drying step comprises freeze-drying or spray drying.

23. A method for conducting a chemiluminescent assay of microorganisms in a sample comprising (a) contacting a sample with the complex of claim 1, (b) separating complex-bound microorganisms from unbound complex, (c) adding an oxidizable substrate and a source of peroxide to complex-bound microorganisms; and detecting complex-bound microorganisms by measuring luminescence.

24. The method of claim 23, wherein complex-bound microorganisms are separated using microbeads attached to a material selected from the group consisting of antibodies, bacteriophage, phage ghosts and purified phage sheath proteins.

25. The method of claim 24, wherein the microbeads are made of a material selected from the group consisting of polystyrene, latex, polymer coated ferrite, polymer coated super-paramagnetic materials, polymer coated and uncoated magnetic materials, silica, and cross-linked polysaccharides.

26. The method of claim 23, wherein the source of peroxide is hydrogen peroxide, benzoyl peroxide or cumyl peroxide.

27. The method of claim 23, wherein the source of peroxide is an enzyme selected from the group consisting of glucose oxidase and amino acid oxidases.

28. The method of claim 23, wherein the oxidizable substrate is a chemiluminescent substrate selected from the group consisting of luminol, lucigenin, penicillin, luciferin, polyaromatic phthalylhydrazides, and derivatives thereof.

29. The method of claim 23, wherein the microorganisms are selected from the group consisting of gram-positive bacteria, Mycobacteria, permeabilized gram-negative bacteria cells and protozoans.

30. The method of claim 29, wherein the microorganisms are gram-positive bacterial cells selected from the group consisting of aerobic spore-forming Bacilli, anaerobic spore-forming Bacilli, Listeria, Nocardia, Pneumococci, Staphylococci, and Streptococci.

31. The method of claim 29, wherein the microorganisms are Mycobacteria selected from the group consisting of *Mycobacterium tuberculosis hominis*, *M. bovis*, *M. avium, M. paratuberculosis,* and *M. leprae*.

32. The method of claim 29, wherein the microorganisms are permeabilized gram-negative bacterial cells selected from the group consisting of Neisseria, Flavobacter, Salmonella, and Enterobacteriaceae.

33. The method of claim 29, wherein the microorganisms are protozoans and are Plasmodia.

34. A diagnostic kit for conducting a chemiluminescent assay of microorganisms, comprising: the complex of claim 1, a source of peroxide and an oxidizable substrate.

35. The diagnostic kit of claim 34, wherein the oxidizable substrate is a chemiluminescent substrate selected from the group consisting of luminol, lucigenin, penicillin, luciferin, polyaromatic phthalylhydrazides, and derivatives thereof.

36. The diagnostic kit of claim 34, wherein the source of peroxide is hydrogen peroxide, benzoyl peroxide or cumyl peroxide.

37. The diagnostic kit of claim 34, wherein the peroxide source is an enzyme selected from the group consisting of glucose oxidase and amino acid oxidases.

38. The diagnostic kit of claim 34, wherein the transition metal in the complex is Co or Cr.

39. The diagnostic kit of claim 38, wherein the glycopeptide antibiotic in the complex is vancomycin.